**iiiiiSelf Study 1 - Aug. 31, 2012**

Directives for self-study assignments

The self-study assignments are opportunities for self-directed learning.  You should try to research the topic by using text books and on-line resources.  To see if you understand the material, you should write out the answers to the learning objectives.  There will be three questions on this assignment on the Unit 1 exam.

Clinical scenario:

An elderly couple had been in reasonable health until the weather turned cold that fall.  For the first time that season, they turned on the furnace and closed the windows in the house.  When their son visited them for the first time in 2 days, he noticed that they were complaining of headaches, confusion, fatigue, and some nausea.  On arrival at the emergency department, both patients were afebrile with normal vital signs and oxygen saturation of 99 percent.  Their lips appeared to be very red.  Both patients were slightly confused but otherwise oriented.  The physical examinations were within normal limits.  Based on their living circumstances and examinations, the preliminary diagnosis was carbon monoxide poisoning.

Learning issues:

1. What are the symptoms of carbon monoxide (CO) poisoning and how is it diagnosed?
   1. Co monoxide poising has symptoms of
      1. Shortness of breath
      2. Dizziness
      3. Nausea
      4. Light headedness
   2. Diagnosis
      1. possible to diagnose due to the cherry read flush of the monoxide poising (carbon monoxyhemoglobin causes flushing)
   3. Also possible to diagnose using the oxygen saturation of 99%, which signifies a lack of oxygen, released, due to r state.
2. What are the major protein targets bound by CO and the physiological effects of this binding?
   1. Hemoglobin
   2. CO binds in the heme binding is 200 times greater than the affinity o2 has for heme
   3. O2 has a greater affinity to stay bound in CO T4 state than in the R state.
   4. CO also binds to myoglobin and cytochrome (anywhere there is iron)
3. How would you differentiate between CO poisoning and flu in terms of symptoms and onset in different family members?
   1. May be very difficult to differentiate as CO has flu like symptoms
   2. CO will be in the blood as COHb complex.
   3. Everyone will get sick at once in the home with CO
   4. People feel better when away from the home
   5. Pets get sick
   6. No fever (afibril) – no swollen lymph nodes
   7. Correlation between turning on an improper furnace

4.  Compare similarities and differences between CO and cyanide poisoning in terms of symptoms, mechanisms, and treatment.

Cyanide poisoning

-affects the cytochrome V complex and the interaction that it has with oxygen, so it impairs the oxidative phosphorylation. Carbon Monoxide also binds to cytochrome but that is not the main target. Cyanide is more attracted to ferric, and I believe CO prefers Ferrous.

- Cardiac shock may occur through vasoconstriction due to poisoning and pulmonary edema have also occurred.

Symptoms of cyanide poising:

Coma, shortness of breath, dizziness and seizure.

Pink skin as well

Treatment for CN:

Stomach pumped

Hydroxycobolamin may be used (cyanokit)

Nitrite and sodium thiosulfate (convert hemoglobin form Ferrous to Ferric to methemoglobin which can pull the CN away from the cytochrome oxidase!)

Glucose

Cobalt salt

3-mertcaptopyrvate (thiosulfate that binds to create a less toxic thiocyanate with CN that leaves through Urine)

Sulfur donors used

Treatment for CO poisoning

100% oxygen therapy

Hyperbaric champer